CLAIMS

What is claimed is:

1. A threaded fastener inspection system comprising:

a conveyor;

at least one imaging device, wherein said at least one imaging device images said threaded fasteners at a plurality views during rotation of said threaded fastener along said conveyor; and

a computer processor interfaced with said imaging device, wherein said computer processor is programmed to recognize and detect threaded fastener damage.

2. The system of claim 1, wherein said computer processor is programmed to analyze the major and minor diameters of said threaded fastener at said plurality of views and compare said major and minor diameters to predetermined values to detect threaded fastener damage.

3. The system of claim 1, wherein said conveyor comprises:

a rail; and

a belt, wherein a portion of said belt is aligned along the length of said rail so that said threaded fasteners are secured between said belt and said rail and so that movement of said belt results in the rotation of said threaded fastener along said rail.

4. The system of claim 3, wherein said rail is a spring loaded rail.

5. The system of claim 1, wherein said at least one imaging device captures overlapping images of said threaded fasteners as said threaded fastener travels within the range of view of said at least one imaging device.

6. The system of claim 5, wherein said at least one imaging device captures six images of said threaded fasteners, one for each 30 degree rotation said threaded fastener makes, as it travels within the range of view of said at least one imaging device.

7. The system of claim 1, wherein said at least one imaging device is stationary.

8. The system of claim 1, wherein said conveyor further comprises a distal end and a sorter, wherein said sorter is positioned at said distal end of said conveyor and wherein said sorter is activated when said computer processor identifies a defective threaded fastener so that damaged threaded fasteners are sorted from undamaged threaded fasteners.

9. The system of claim 8, wherein said sorter is a trapdoor.

10. The system of claim 9, wherein said threaded fasteners identified as damaged are discarded into said sorter.

11. The system of claim 1, further comprising an illumination device oriented opposite of said imaging device.

12. The system of claim 1, further comprising a threaded fastener head damage inspection system, wherein said head damage inspection system comprises:

a rotating tray having a plurality of openings therein for receiving threaded fasteners;

at least one head damage imaging device, wherein said at least one head damage imaging device images said threaded fasteners; and

a head damage computer processor interfaced with said head damage imaging device, wherein said head damage computer processor is programmed to analyze the threaded fastener heads of said threaded fasteners and compare said threaded fastener heads to default limits to detect threaded fastener head damage.

13. The system of claim 12, wherein said threaded fasteners are securable within said plurality of openings so that the threaded fastener head is exposed.

14. The system of claim 12, wherein said conveyor is positioned to accept threaded fasteners exiting from said threaded fastener head damage inspection system.

15. The system of claim 12, wherein said threaded fastener head damage is selected from the group consisting of cracks, splits, and improper sealing.

16. A threaded fastener inspection system comprising:

a conveyor, comprising:

a rail; and

a belt, wherein a portion of said belt is aligned along the length of said rail so that said threaded fasteners are secured between said belt and said rail and so that movement of said belt results in the rotation of said threaded fastener along said rail;

at least one imaging device, wherein said at least one imaging device images said threaded fasteners at a plurality views during rotation of said threaded fastener along said conveyor;

a computer processor interfaced with said imaging device, wherein said computer processor is programmed to recognize and detect threaded fastener damage; and

a sorter positioned at the distal end of said conveyor, wherein said sorter is activated when said computer processor identifies a defective threaded fastener so that damaged threaded fasteners are sorted from undamaged threaded fasteners.

17. A system of claim 16, wherein said computer processor is programmed to analyze the major and minor diameters of said threaded fastener at said plurality of views and compare said major and minor diameters to predetermined values to detect threaded fastener damage

18. A method of identifying damaged threaded fasteners, comprising:

providing threaded fasteners;

rotating said threaded fasteners;

imaging said threaded fasteners at a plurality of views during said rotation;

analyzing said views to determine if said threaded fasteners are damaged; and

sorting damaged threaded fasteners from undamaged threaded fasteners.

19. The method of claim 18, further comprising the steps of:

determining major and minor diameters of said threaded fasteners at said plurality of views; and

comparing said major and minor diameters to predetermined values to determine if said threaded fasteners are damaged.

20. The method of claim 18, wherein said imaging step includes imaging heads of the threaded fasteners.

21. The method of claim 18, wherein said comparing is performed by a computer processor.

22. The method of claim 18, wherein said threaded fasteners are rotated on a conveyor.

23. The method of claim 18, wherein said imaging is performed by a digital camera.

24. The method of claim 18, wherein said imaging step includes capturing overlapping images of said threaded fasteners as said threaded fastener travels within the range of view of said at least one imaging device.

25. The method of claim 24, wherein said imaging step includes capturing six images of said threaded fasteners, one for each 30 degrees of rotation said threaded fastener undergoes, as said threaded fastener travels within the range of view of said at least one imaging device.